

Amendments to the Specification

Please replace the paragraph beginning at page 2, line 23 with the following amended paragraph:

In a preferred embodiment method of making a sand mold, a sand mold mixture containing moisture is placed into a pattern, and the sand mold mixture is restrained in the pattern by placing a perforated lid on the pattern, the perforated lid having apertures with a hydraulic radius of 0.5 inch or less. The pattern containing the sand mold mixture is exposed to a vacuum, the vacuum being low enough to flash off the moisture in the sand mold mixture thereby drying the sand mold mixture to create a sand mold, and the restraining member preventing voids in the sand mold.

Please replace the paragraph beginning at page 5, line 9 with the following amended paragraph:

The term restraining means containing the sand mold mixture on all sides with apertures large enough to allow vapor to escape but small enough to contain the sand mold mixture. The sand mold mixture is contacted on all sides with the pattern box and the restraining member to compress, restrain, and/or contain the sand mold mixture thereby inhibiting movement of the sand mold mixture while concurrently allowing vapor to escape. Preferably, the hydraulic radius of the apertures is 0.5 inch or less, the hydraulic radius being the area of the aperture divided by the perimeter of the aperture. The apertures may be square, round, rectangular, triangular, or any other suitable shape. However, it is recognized that smaller holes should preferably be used with larger pattern boxes. When the pattern boxes get very large, vents may have to be placed over the apertures. Also, it is recognized that the size of the apertures depend largely upon the size and/or the porosity of the sand particles used. Therefore, in order for the moisture to escape the sand mold mixture, the sand particles may be moved/separated by the moisture thereby creating cracks and/or voids in the sand mold if no restraining member is used, especially if the moisture is drawn off too quickly.

Please replace the paragraph beginning at page 6, line 14 with the following amended paragraph:

The lid or restraining member preferably has apertures having hydraulic radii of 0.5 inch or less that are uniformly spaced. The apertures should be spaced apart a distance large enough to maintain the integrity of the sand mold surface. The apertures could be squares, circles, slots, triangles, etc. as long as the sand is sufficiently restrained. Alternatively, a screen-type member could be used as the lid or restraining member. The lid or restraining member is used to uniformly restrain the sand during the application of the vacuum at lower vacuum levels to reduce the drying time while preventing cracks and/or voids from forming in the sand mold. The lid or restraining member helps contain the sand and allows moisture to be drawn out of the sand mold quickly without disturbing the surface of the sand mold. In addition, the lid maintains the pressure inside the mold at a level such that the water that vaporizes at the maximum rate can pass through the sand without causing popping and/or cracking of the sand mold. The terms popping and cracking and the terms cracks and voids are used interchangeably throughout to indicate the many types of defects that may occur in the sand mold during vacuum drying of the sand mold.

Please replace the paragraph beginning at page 17, line 13 with the following amended paragraph:

Because different shapes of apertures may be used, the hydraulic radii of the apertures in different restraining members were used to compare the effect of the size of the apertures in the restraining member (the amount of restraint) regardless of the specific shapes of the apertures. The hydraulic radius is the area of the aperture divided by the perimeter of the aperture. For example, the hydraulic radius of a circular aperture is the area divided by the circumference. The maximum hydraulic radius that produced an acceptable mold was about 0.5 inch, which corresponds to a circular aperture 2 inches in diameter, for a mold containing approximately 80 pounds of sand. As the mold size increased to approximately 250 pounds of sand, the maximum hydraulic radius for producing a good mold was about 0.25 inch, which corresponds to a circular

aperture 1 inch in diameter. It is hypothesized that the aperture size needs to be reduced with the increase in the mold size because the amount of moisture and “steam” created is increased when the vacuum is applied.

Please replace the table beginning at page 19, line 9 with the following amended table:

Table 4

Comparison of Apertures with Different Shapes and Sizes

<u>Shape</u>	<u># of Apertures</u>	<u>Size (inches)</u>	<u># of Box Levels</u>	<u>Hydraulic Radius (inches)</u>	<u>Total Open Area (square inches)</u>	<u>Mold Quality</u>
Round	208	0.5 diameter	1	0.125	41	Good
Round	208	0.5 diameter	2	0.125	41	Good
Round	208	0.5 diameter	3	0.125	41	Good
Round	208	0.5 diameter	3	0.125	41	Good
Rectangular	91	0.3 x 1.5	3	0.125	41	Good
Round	52	1.0 diameter	1	0.25	41	Good
Round	52	1.0 diameter	3	0.25	41	Some Popping; Not Good
Round	52	1.0 diameter	3	0.25	41	Good
Rectangular	23	0.6 x 3.0	3	0.25	41	Good
Round	13	2 diameter	1	0.5	41	Some Popping; Good
Round	13	2 diameter	3	0.5	41	Popping; Not Good
Rectangular	1	3 x 17	3	1.28	51	Popping; Not Good
Rectangular	2	7 x 17	3	2.48	238	Popping; Not Good
No Lid	1	17 x 17	1	4.25	289	Popping; Not Good

Please replace the paragraph beginning at page 20, line 2 with the following amended paragraph:

The results show that with a one level box, a good mold could be made with the 0.5 inch hydraulic radius, a 2 inch diameter round aperture, although the top of the box had some distortion. With a 0.25 inch hydraulic radius aperture, a 1 inch diameter round aperture, the mold had no defects. With a three level box, the maximum hydraulic radius to make a useable mold was 0.25 inch with both round and rectangular slotted apertures. At the 0.25 inch hydraulic radius, there was one instance where sand blew out of a lid opening during vacuum drying, ruining the mold. Therefore, 0.25 inch may be a border-line hydraulic radius for larger amounts of sand.

Please replace the table beginning at page 20, line 19 with the following amended table:

Table 5

Vacuum Drying of Different Shape of Mold Box

<u># of Apertures</u>	<u>Diameter (inches)</u>	<u># of Box Levels</u>	<u>Sand Weight (pounds)</u>	<u>Hydraulic Radius (inches)</u>	<u>Total Open Area (square inches)</u>	<u>Mold Quality</u>
13	2	1	250	0.5	41	Popping; No Good
52	1	1	250	0.25	41	Good